SoilTRAX TITAN

User Manual

RINEX TECHNOLOGY

Over 10 years experience in spatial data and satellite positioning.

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SoilTRAX<small>TITAN</small> User's Manual
Written for SoilTRAXTITAN Software, Version 1.0

1 User's Manual
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1   Introduction

1.1   **SoilTRAX**TITAN

The RINEX SoilTRAXTITAN system has been developed to combine the advantages of the low-cost, easily portable Pocket PC (P/PC) platform with the benefits of accurate GPS technology, and local software development, to provide an easy-to-use system for soil sampling operations.
rred from the Pocket PC to the home/office PC and records completed, printed and stored in the comfort of the office. Data entry forms have been customized to make entering data for the different testing laboratories quick, easy and accurate.

1.2   **This Manual**

This manual is designed to assist users of the SoilTRAXTITAN system in the operational use of the product.
The first part of this manual presents information on connecting and setting up the SoilTRAXTITAN hardware components, followed by instructions on using the SoilTRAXTITAN software, to carry out the paddock operations on the Pocket PC.
Further sections detail how to transfer the data from the Pocket PC to the home/office PC, and how to use the software provided for that platform, to complete data entry, print and store the collected data.

To present additional information considered a *Hint* or *Tip,* the graphic   will be shown to the left of the italicized text.

Menu descriptions will be shown in capitalized text, such as the FARM menu, while button names will be shown in Italics, as in the *Bring to Front* button. The terms "menu" and "button" are explained in the following section.

1.3   Terminology used in this Manual.

When we say……	We Mean….
SoilTRAXTITAN **hardware**	The hardware system installed in your vehicle cabin which is used by the SoilTRAXTITAN software modules. That is, the Pocket PC, GPS antennae, and can include any connected device, cables and connectors.
P/PC	The Pocket PC device, running the Microsoft® Windows® CE operating system, which is used to carry out the sampling operations.
SoilTRAXTITAN **software**	The software modules (programs) produced by RINEX Technology which run on the P/PC or Pocket PC.
SoilTRAX **office software**	The software provided to run on the home/office PC.
Touch-screen	The Pocket PC display which shows the progress of your operation, and accepts commands by pressing (touching with your finger) icons shown on the screen.
Barcode Reader/BCR	An optional device that will read the values represented in bar codes.
Icon	A symbol representing a function, shown on the touch-screen, which allows the input of data or commands when pressed.
Menu	A group of icons shown at the bottom of the touch-screen, which allow access to other menus or functions.
Sub-menu	A menu which appears as a result of selecting an icon from a previously appearing menu.
Map Screen	The area of the touch screen above the menu icons, which displays the paddock information and maps.
Toolbar Button	Similar in functionality to an icon, these boxes appear across the lower part of the screen and can be pressed to allow input of information.
Vehicle Position Marker	The symbol appearing on the map screen to mark the position of either the vehicle, or in view mode, the focal point.
Layer	An object or group of objects with a common function, that can be viewed on the map screen. (E.g. waypoints)

Top (or front) Layer The layer which is drawn last on-screen. Layer number 1.

GPS **G**lobal **P**ositioning **S**ystem. Provides the basic positioning information for the system.

DGPS **D**ifferential **G**lobal **P**ositioning **S**ystem. A correction signal is applied to the GPS information, increasing the accuracy of the reported position.

Differential See DGPS

Sample Point The actual location of where a soil sample has been taken.

Waypoint A marker identified by a number on the map screen for guide an operator to a location in a paddock.

Sample Point ID The unique ID given to identify a sample point on the map screen.

Sample Number/Sample ID# The number, or letter & number combination, which identifies the physical soil sample bag to the testing laboratory.

AIF Area Information Form. A form containing detailed information about the area in which soil samples have been taken.

Job/Job Number Used to identify and group separate paddock operations. Is either text or a number, identifying operations required to be carried out for one customer, or as an overall task.

Relative Bearing The required bearing to the selected object, relative to the vehicle's current direction. I.e. if the vehicle is moving directly away from the object, the relative bearing is 180degrees. If the selected object is a line, then the relative bearing is the direction of the vehicle relative to the direction of the line.

Unit The measurement unit used to evaluate mass, volume, area, length etc. (Example: Kilogram, Tonne, Litre)

Synchronization The process of ensuring that data stored in two separate locations is the same. Data files are either deleted from one location or copied to the other to achieve this end.

2   System Hardware

This section details the hardware components of a SoilTRAXTITAN system, provides information on connecting these components into a working system.

The SoilTRAXTITAN system is relatively simple to install in any vehicle. The following installation procedures are recommended for typical vehicle operations. However, every vehicle installation will have specific characteristics, which can not be dealt with in this manual. If the user is uncertain as to the best installation method for unusual vehicles they should contact RINEX Technology for further information.

The purpose of this section is to familiarize the user with the individual components of the system and their function. If any of the equipment shown is not contained within the packing boxes, or damaged when opened, please contact RINEX Technology immediately.

2.1   Packing List

2.1.1   Standard Components

The standard SoilTRAXTITAN system consists of all the following components.

Cassiopeia P/PC device.	Includes Microsoft CE Services CD with software bundle, rechargeable battery pack and Casio user manuals and compact flash card.	
Interface Box	Includes 1metre length power lead terminated with "cigarette lighter" style connector	
Power cable	Connects to vehicle battery and provides power for the interface box.	

Power / Data Cable	To connect GPS to the Pocket PC.	
P/PC 240V AC Plugpack power supply	For Office use.	
Vehicle Mounting kit for P/PC device	Includes cradle for the Cassiopeia, swivel mounting "wacki" bracket and Velcro strips.	
SoilTRAX TITAN Software CD.	Contains software for installing SoilTRAX Office software on the Office PC.	
SoilTRAX TITAN User Manual	(This Manual)	
Zio Compact flash card reader Kit	Contains necessary equipment for transferring data between the Pocket PC and the office computer	

2.2   Installation

The installation of the SoilTRAXTITAN system into the vehicle is an easy operation. Typically the system can be installed in a few hours and only a few handyman tools will be required.

2.2.1 Layout Diagram

The completed SoilTRAXTITAN system should be connected as per the following diagram.

Antenna

Cassiopeia
Pocket PC

Power Filter

Power

GPS Receiver

Port B

RF Port

Port A

Power Port

Barcode
Reader
(Optional)

Battery
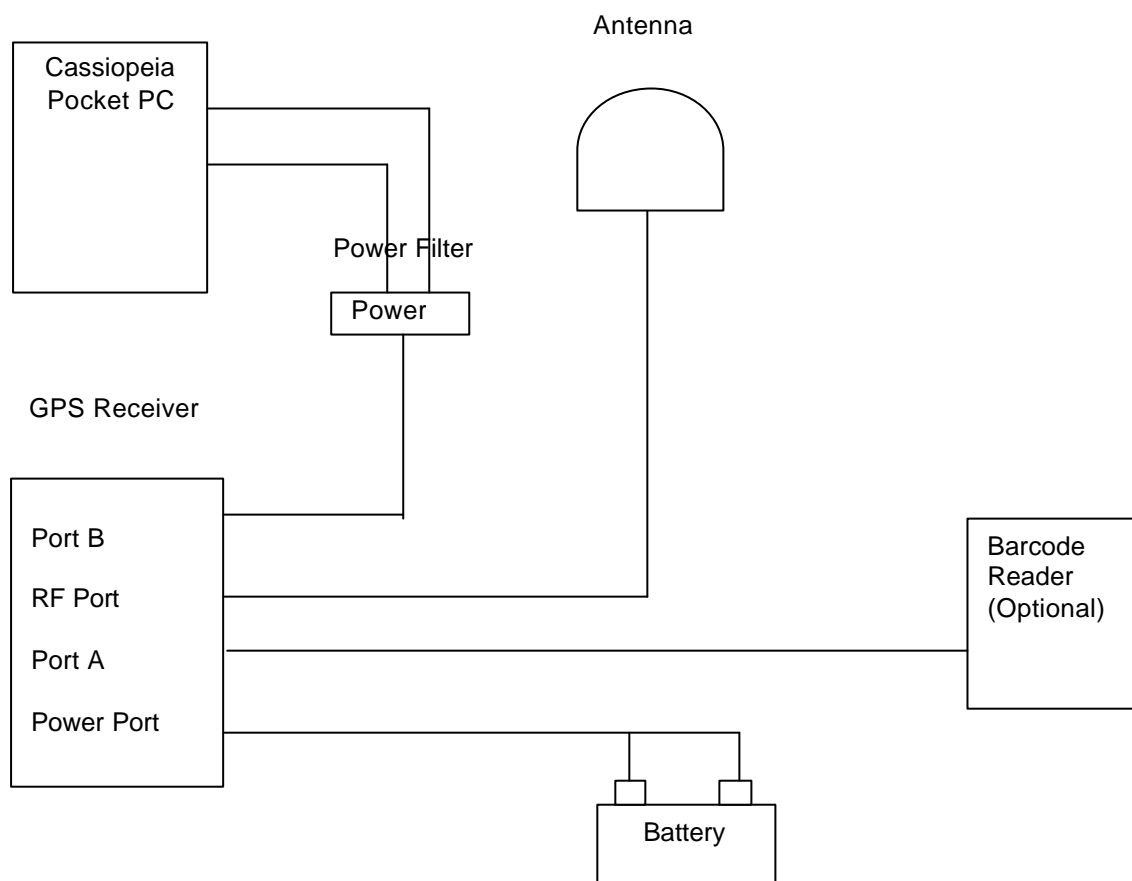
Typical Vehicle Layout
As each vehicle and operator is different a typical vehicle installation is never quite the same. However the following points should be considered when installing the unit into the vehicle.

2.2.2 Touch Panel Display (Cassiopeia pocket PC)

The display should be mounted in the cab such that it provides a clear view of the screen, which is in arms reach for activation of the system. It is important to ensure that the screen does not impede the driver's vision for safe operation of the vehicle.

As direct sun on the screen makes it difficult to view the screen, consideration should be given to the mounting position. The swivel mounting post allows the screen to be tilted so that it is possible to shade the screen from direct sunlight in most situations.

The mounting positions of the screens have been either from somewhere along the dashboard, the side pillars or even the roof of the cab. The swivel mount then allows the display to be oriented toward the operator for normal operation of the vehicle.

Once the position of the display panel has been decided, the swivel base plate should be attached to the vehicle with the supplied self drilling screws, or equivalent, checking that no wiring looms or components will be affected by the screws.

Fit the pocket PC and cradle to the vehicle.

First, fit the device into the cradle, next pass the data cable through the hole in the bottom of the bracket and plug into data port in base of pocket PC.

Slide the metal clip over the back of the bracket and ensure that the locating lugs are in the corresponding slots on the pocket PC. Insert the power cable in the lower left side.

Attach pocket PC to bracket.

Fit the wacki bracket to the rear of the screen cradle, if not already assembled. Find a suitable location for the pocket PC:

- **-** Close to your line of sight.

- **-** Out of direct sunlight.

- **-** Physically strong enough to support the weight of the unit.

    Warning : Do not fit in a location that obstructs your vision when driving.

    - Ensure that the screen can be rotated and tilted to provide best viewing by the operator.

    - Ensure that there is enough room at the top of the unit to be able to withdraw the pen stylus from it's holding slot.

Remove the cradle from the wacki bracket, then mount the bracket using either Velcro or the four mounting holes provided. Reattach the cradle and slide the Pocket PC clip over the bracket locating its base in the bracket retaining grooves.

2.2.3 DGPS

The DGPS should be mounted in the cab where it can be accessed for switching the power ON and OFF as required. The length of cable from the DGPS receiver to the Cassiopeia pocket PC should also be checked ensuring that the devices may be connected together.

Once the position of the DGPS has been decided, the base plate should be attached to the receiver and then to the vehicle with the supplied self-drilling screws, or equivalent, checking that no wiring looms or components will be affected by the screws.

The mounting of the GPS equipment depends on the type of receiver being used.

Important:

    Locate antenna as far apart as possible from any transmitting antennae such as two-way radio and mobile phones. Cabling should also be run as far apart as possible.

    Magnetic antenna mounts are not designed for high-speed vehicle use. Remove the antennae for road use of the vehicle, or consider fixing the antennae by alternate means.
    Antenna cables are vulnerable to damage by crushing. Do not route the cable where doors or windows can crush it.

Do not allow the antenna cable to "flap in the breeze". Outside the vehicle, use cable ties wherever possible to support cable.

Do not attempt to split, join, repair or terminate GPS antenna cable. Professionally made cables should always be used.

2.2.4 DC Power

The system should be connected to a switched power source in the vehicle. The system will operate in the range of 10-24vDC. The supplied fuse should be placed on the red wire which is connected to the positive (+ve) power source. The black wire should be connected to a ground source on the vehicle.

2.2.5 Starting the System

The system should be wired to a keyed power source. Hence once the vehicle is started the OmniLite receiver will be powered ON and the pocket PC will be charged from the vehicle's power supply.

2.2.6 Power up and Test SoilTRAX TITAN

Once all the connections have been made, DC power can be applied. The system is designed to operate from 10 to 24VDC (-ve ground). We recommend wiring as close to the battery as possible. Consult a qualified technician if required.

Once all components have been connected to the pocket PC, start your vehicle first to ensure even power to the system, then turn on the main power switch on the OmniLite receiver, and the ON/OFF button on the top left corner of the pocket PC.

Your device will usually start in the Windows CE 'Today' menu. With Windows CE there is no delay in start-up. The red light top left on the pocket PC indicates charging, the green fully charged. Use the Cassiopeia handbook to explain it's powerful features as a pocket PC

2.3   Starting the SoilTRAX TITAN Software

The SoilTRAX software can be started either by pressing the hot key button on the side just above the power in port, or by selecting the program from the drop down list in the Start Menu. Use the stylus pen or your fingernail to do this.

While the Windows CE and SoilTRAX software can be started straight away, the GPS receiver may need some time to lock on. While this is occurring, the GPS status icon on the map screen may show an alarm warning that DGPS has not locked to the satellites. When the icon changes to a moving GPS logo then the receiver is ready for normal operation.

If the system is being used for the first time (or has not been used recently), other icons indicating lack of signal may remain for up to 15 minutes, while the GPS receiver gathers new information about available GPS satellites.

Once the icon starts running, follow the instructions to activate the OmniSTAR subscription. Keep the vehicle out in the open when you do this. If you do not activate your subscription, you will loose differential within a few hours.

2.4   Operating Notes

2.4.1 Reset

If the pocket PC becomes unresponsive to commands, or appears to be operating abnormally, a RESET button is provided on the rear of the unit. The stylus pen is required to depress the button.

WARNING:

Using the RESET function may cause data to be lost. If possible, shutdown the SoilTRAXTITAN **software before resetting the device.**

2.4.2 Adjusting Screen Display

Adjustments can be made to the screen contrast and brightness. Click 'Start', 'Settings', 'system' tab, and 'Brightness' button to find controls.

2.4.3 On-screen Keyboard

The keyboard raised by pressing the button on the lower right front panel of the device should not be used while the SoilTRAX program is running. Use the onscreen keyboards provided by the program.

2.4.4 Office PC Specifications

Architecture: IBM Compatible
Minimum Processor: Pentium 75
Operating System: Windows95, 98, NT, or XP
Resources: CD -ROM drive
                         1 spare COM port (adapter required for 25pin connector)
Free Disk Space: At least 40MB

3   Using the SoilTRAXTITAN Software

This chapter will introduce you to the ways in which information is presented on the SoilTRAXTITAN screen, and how you use that information to carry out the required operations in the field. On-screen help is also available on the system.

3.1   Starting the System

Once all components have been connected to the Pocket PC, operating the ON/OFF button on the top-left-hand-side of the device activates the system.
If the SoilTRAXTITAN program was running when the Pocket PC was last switched off, then it will reappear on the display and continue to run.
If the SoilTRAXTITAN program was shut down before the Pocket PC was last switched off, then selecting the program from the list in the Start Menu can restart it.
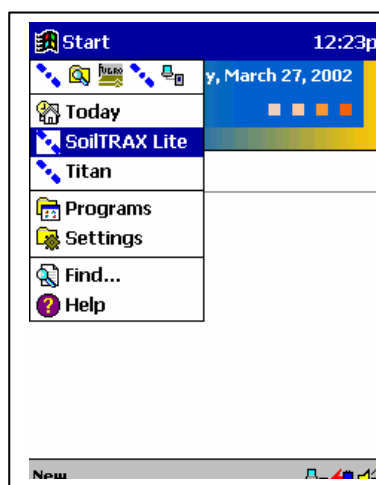
The Start Menu

After starting the software, the system will load all required modules, and perform start-up checks of all system components. If any problems are detected, an advisory message will be shown.
Once the system checks have completed, the software will load all available information on the paddock that was in use when the system was last shut down. If you have already collected data in this paddock, this data will be reloaded and shown.

3.2   The Displayed Screen

The SoilTRAXTITAN touch screen display has been designed to show the maximum information on-screen, while still providing large "buttons" which are easy to target for command decisions on the move. Major components of a typical display are as shown in fig 3.2:
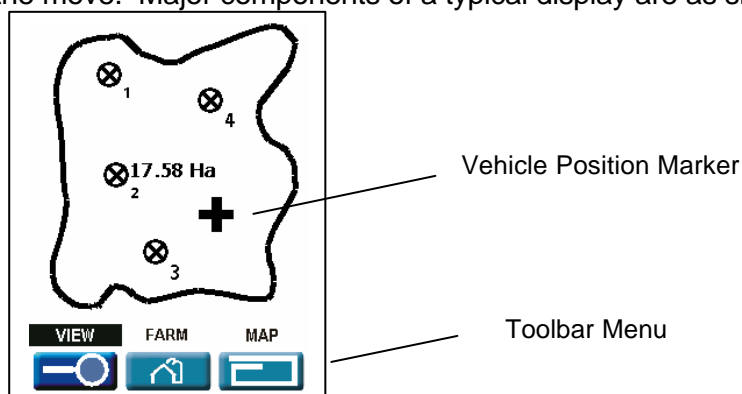
Figure 3.2- The displayed screen and main menu

3.2.1 Toolbar Menu icons

These are "buttons" which when touched or pushed, perform an action in the program. The buttons are grouped according to their function into a menu. A list of all menus and their associated buttons appears in Appendix A. Where there are more options that cannot be displayed on the screen, pressing the round cursor button right or left (Fig 3.3), located at the bottom left of the P/PC will display the other menu options.

Press Left ————   ———— Press Right

Figure 3.3 – The cursor button

3.2.2   **Status Bar**

Map Screen
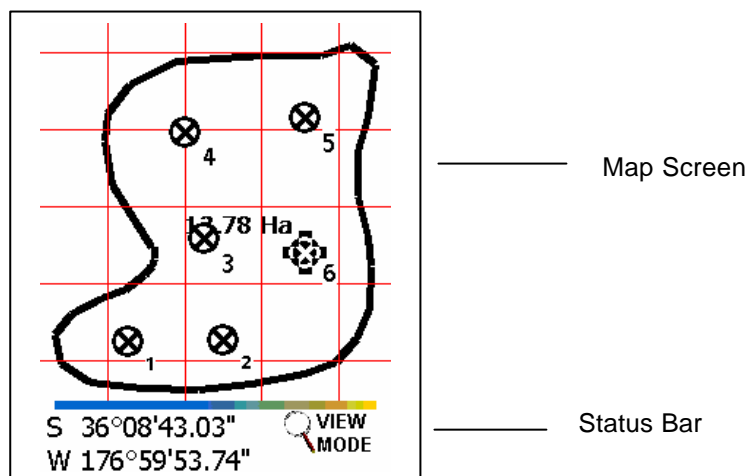
Status Bar

To display the status bar press the cursor button up until you reach the top of the menu structure.
This area can be used to display the current position of the vehicle, or the status of the GPS information. The position information can be displayed as either Eastings & Northings or Latitude & Longitude values.

3.2.3 The Map screen area.

Occupying most of the display, the map screen area is where the paddock information is shown. A grid may optionally be overlaid on the map screen. The current vehicle position is

displayed with a   symbol and moves in relation to other displayed objects, such as boundaries, waypoints and sample positions.

3.3   **The Layer Concept**

Information relating to objects or treatments for a paddock is stored in layers. Each layer contains information about objects of a similar type. (For example, CSBP Soil Samples for a paddock would be stored in one layer, boundary information in another layer and backdrop maps in another.) Storing the information in this way makes it easy to access, print or display only the information you need at the time.
The map screen draws the paddock information on the screen layer by layer, with the top layer being drawn last. (Each layer draws over the previous one.) Each individual layer can be turned on or off, and the order of drawing can also be changed.

Individual layers can also be deleted from the system. From the FARM-LAYERS menu option, select the layer that you wish to delete, then press the button labeled **_Del…_**

3.4   Storing Your Information

The SoilTRAXTITAN software uses a hierarchical structure for the storage of data gathered in paddock operations.

Understanding how the SoilTRAXTITAN software stores the data gathered from your paddock operations will assist you in:

Deciding on farm and paddock names, when setting up for the first time.

Accessing that information at a later time.

Consider the following diagram, illustrating the structure used to store your data.

The system contains multiple Farms (or Clients).

Each farm contains multiple paddocks.

Each paddock contains multiple layers. Each layer contains the data for one operation (waypoints, boundaries, and sample points)
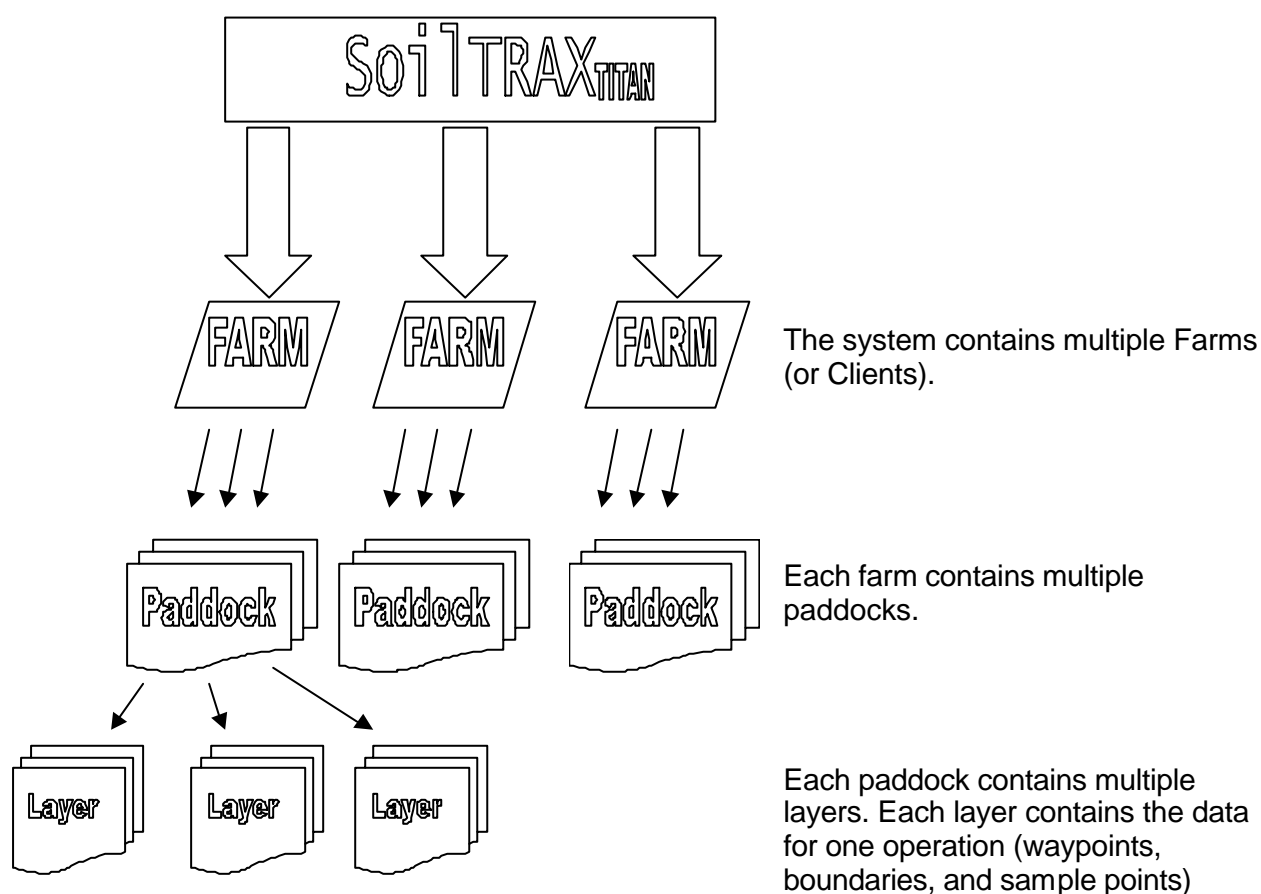
Figure 3.3. - Data Storage Structure

In addition, each layer can be "stamped" with a job number or description. These job numbers can be used to group information about operations from different layers and paddocks, but with the same job number.

Layers stamped with a job number.
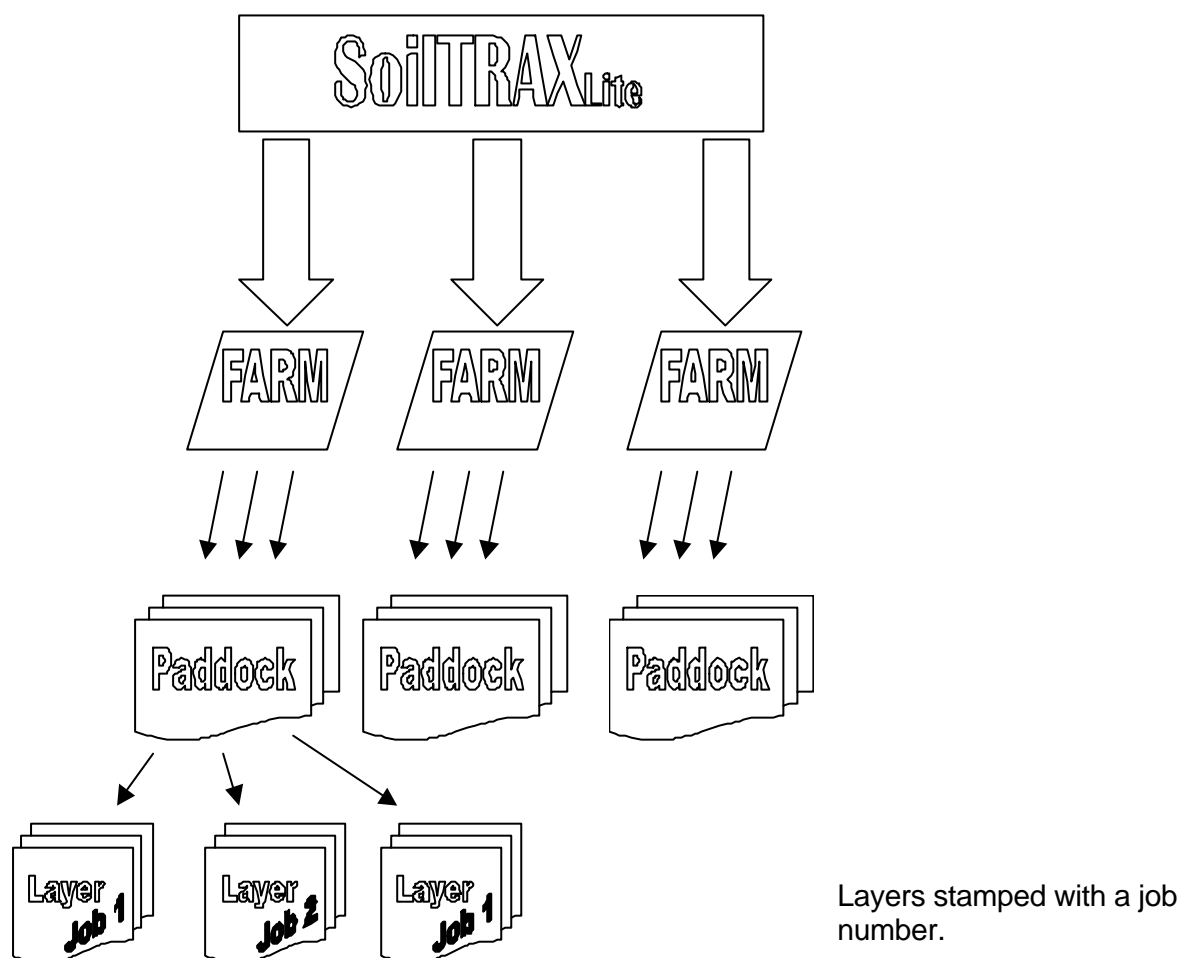
Figure 3.4. - Data Storage with Job Numbers.

3.5   Farms/Clients

As we saw in Fig 3.3. the farm is the top-level item in a hierarchical structure of storing information. Each farm can have multiple paddocks, while each paddock can have multiple operations carried out within it, as in real life. For the purposes of this manual, the term *Farm* will be used, but it could also refer to a client, locality or any descriptor, which could logically hold multiple paddocks.

In order to identify individual farms or clients in SoilTRAXTITAN it is first necessary to enter this information into the database system. The database stores the name of the farm and then individual paddocks are associated with the respective farm names.

The name of the farm can be up to 32 characters long, entered from the on-screen keyboard. When the system is first operated, a farm called RINEX is automatically generated. This farm can not be deleted and can be used for any test paddocks.

3.5.1 Changing the Current Farm

SoilTRAXTITAN always starts in the same farm that was current when the system was last shut down. This farm can be changed at any time by selecting the Farm dialog window, from the Farm menu.

Figure 3.5. The Farm/Client window

Select the required farm from the list, by using the UP/DOWN arrow buttons, then press OK to accept the choice. The selected farm then becomes the current farm, and data belonging to the current paddock in that farm is displayed.

3.5.2 Creating a new Farm.

New farm names can be created and added to the list of farms by pressing the NEW button in the Farm/Client window shown in Fig 3.5. Farm names should be limited in length to fit in display windows.

3.5.3 Changing Existing Farm Names.

Existing farm names can be changed. Press the RENAME button in the Farm/Client window shown in Fig 3.5. All existing data from the old farm will be now associated with the new farm name.

3.6   Paddocks

As seen in Fig 3.3. a paddock "belongs" to a farm, and may contain multiple layers in each paddock. When in single paddock mode, the data that appears on the map screen is that of the current paddock. The current paddock is that which was open the last time that the current farm was selected. Each paddock is given a number unique to each farm, and can be optionally given a name, to make data identification easier. The current paddock number and name is shown as the highlighted selection in the Paddock dialog window.
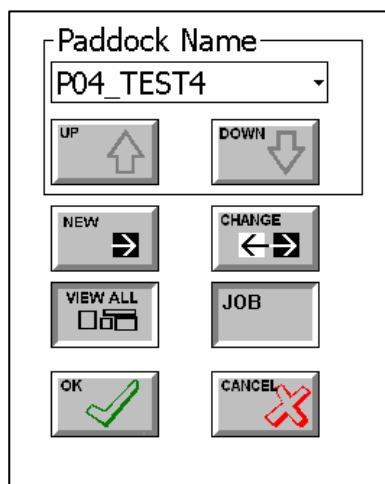
Figure 3.6. Paddock Name window

3.6.1 Changing the current Paddock.

The current paddock can be changed at any time by selecting the Paddock Name dialog window, from the Farm menu. Select the required paddock from the list, by using the UP/DOWN arrow buttons, then press OK to accept the choice. The selected paddock then becomes the current paddock, and data belonging to that paddock is displayed.
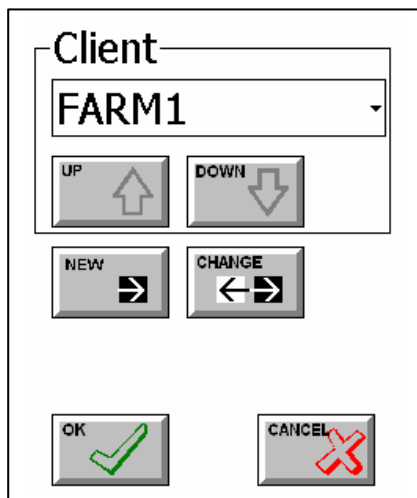
3.6.2 Creating a new Paddock

New paddocks can be created and added to the list of paddocks by pressing the NEW button in the Paddock Name window shown in Fig 3.6. Paddock names should be limited in length to fit in display windows.

3.6.3 Changing Existing Paddock Names.

Existing paddock names can be changed. Press the RENAME button in the Paddock Name window shown in Fig 3.6. All existing data from the old paddock will be now associated with the new paddock name.

3.7   Changing the Paddock View Mode (optional)

The usual way to view paddock information is by viewing the data from one paddock at a time on the map screen. However, it is possible to view data from all paddocks in a farm simultaneously.
To view data from all paddocks in the currently selected farm on the map screen, press the View All button on the Paddock dialog window. The system will load data from all layers that are designated ON, and show each in relation to the others on the map screen. Individual layers can be selected and examined using the LAYER menu option. This can also be achieved by pressing the View button in the settings dialogue.
Once the system has been restarted, the View All function is turned off.

3.8   Using Job Numbers. (optional)

As was shown in fig 3.4, each layer can have a job number allocated to it. This number is used to group or filter paddock operations. Selecting and creating job numbers is done in the Paddock dialog window, from the FARM menu. Pressing the Jobs button on this window will change the Paddock list to a list of job numbers. Selecting a job number from this list will cause all layers in the current paddock with this job number to be shown, and if the View All button is pressed, all layers with this job number in the current Farm, regardless of their paddock number, will be shown. New job numbers can be created after switching to job view mode, by pressing the New button.

3.9   Changing the Operating mode

SoilTRAXTITAN can operate in two modes - GPS (normal) mode, or View mode.
Changing to View mode disables the GPS input, allowing manual movement of the position
marker. View mode also gives access to offline functions not available in Normal or GPS
mode, such as Import/Export of data.
When carrying out operations in the paddock, it is essential that the system be returned to
GPS mode.
To change the Operating Mode, press the MORE button from the Main Menu and press the
View or GPS mode button. The button will change appearance to reflect the changed
setting.

3.10 Zooming & Panning in GPS mode

Changing the scale factor which is applied to paddock information displayed on the map
screen, to make the objects appear closer or further away, is referred to in this manual as
"zooming" in or out. This is done from the VIEW menu
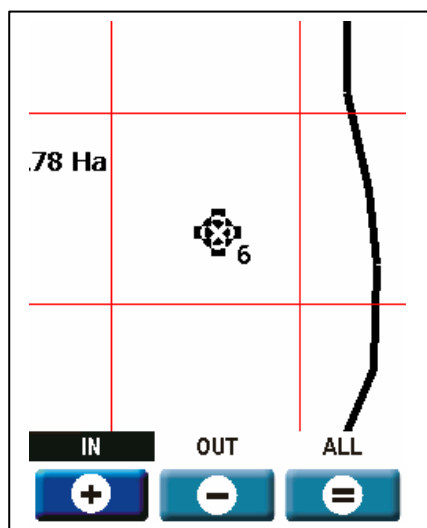
Figure 3.7 - The View menu

Zooming in reduces the scaling factor and presents a "closer in" view of the area around the
vehicle.
Zooming out increases the scale factor, presenting a wider view of the area around the
vehicle.
Zoom All changes the map scaling so that all information, including the backdrop map or
entire paddock boundary, (in fact, any layer that is switched ON) and the present location of
the vehicle is visible on the map screen. If the vehicle subsequently moves off this screen,
the view presented will be that determined by the last zoom in or zoom out command.
 **Note: Using the Zoom All function will attempt to display all layer elements that are
designated ON. This may lead to a less than optimal display if the elements are widely
separated. Turn OFF the unwanted layer(s) in Layer Details, in this case.**

The focal point for zooming in or out when in GPS mode is the vehicle, and as such, it is not
possible to pan (move the view laterally) when in GPS mode.

3.11 Zooming & Panning in View mode

When in View mode, the vehicle position marker can be manually moved to any desired position, as it is no longer determined by the GPS system.

The lateral position of the marker can be changed *(Panning)*, so that a different view of an area can be seen, particularly when zooming in.

To make any change to the presented view position, first touch the screen at the point where you would like the next view to be center, so that the vehicle position marker moves to that point. Then press either the *Zoom In* or *Zoom Out* buttons from the View menu (Fig 3.7). The redraw of the map screen will be done with the view center on the new position, zoomed appropriately.

3.12 Viewing Layer Information

Layers can be opened, to access information about the objects stored within them.
To open a layer, select the LAYERS button from the FARM menu.
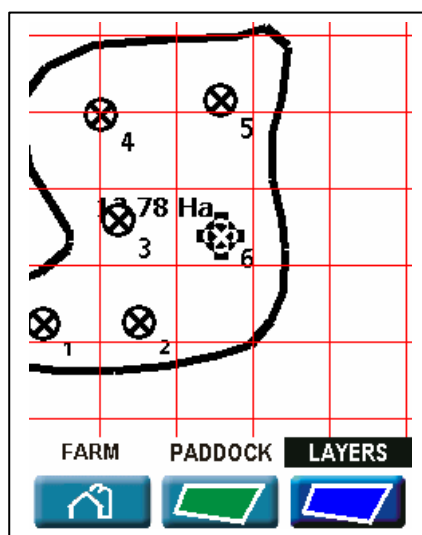
Figure 3.8 The FARM menu

If there is more than one layer in the paddock, select the layer to view, by pressing the Layer Number button in the Edit Layers dialog window. Then press the DETAILS button.
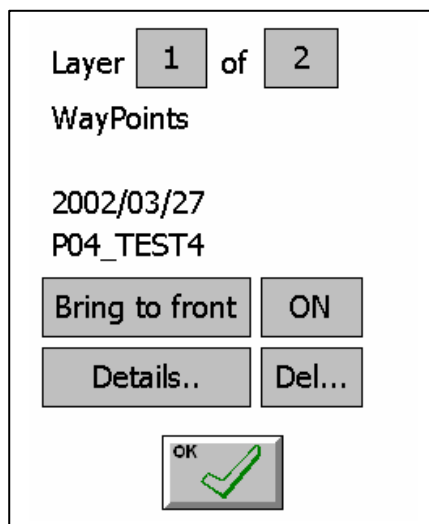
Figure 3.9 - The Edit Layers window

Where there is more than one object in the layer, each object can be selected by pressing the Object Number button.

If you touch the waypoint or sample point on the screen before pressing LAYERS, the Details window will immediately show the selected point.
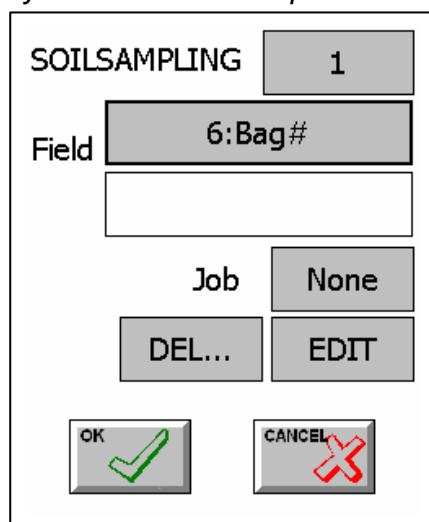
Figure 3.10 - Layer Details window.

Different aspects of the object can be displayed by pressing the FIELD button. The information that is shown will depend on the type of layer that is being viewed.

3.13 Making a Layer the Front Layer

When paddock data is written to the map screen, each layer of information is drawn sequentially. Making a layer the front (or "top") layer means that that layer becomes the last layer drawn on the map screen. This stops other layers from hiding the wanted information, by overwriting the image.

To make a layer the front layer, select the layer in the *Edit Layers* dialog window, and press the *Bring to Front* button. The layer will then become *Layer 1* of however many layers are visible.

3.14 Turning Layer Display On or Off

Sometimes, the information contained in one layer type obscures the information being displayed for another layer type. For example, waypoints and Sample points taken in close proximity to each other.

Any layer can be viewed or hidden from the Farm - Layers window *(Refer Fig 3.9).* Select the layer to be hidden, then press the button currently labeled ON. The button label will change to OFF, and the layer information will be removed from the map screen display, after pressing the OK button.

3.15 Screen Grids

A grid can optionally be overlaid on the map screen and can be used to quickly estimate distances from point to point.

The distance between divisions and activating or deactivating labels for each division are set in the General Setup window, from the MAIN - MORE menu.

To activate or deactivate the map screen grid, select the *Grid* button from the SETUP-GRID menu.
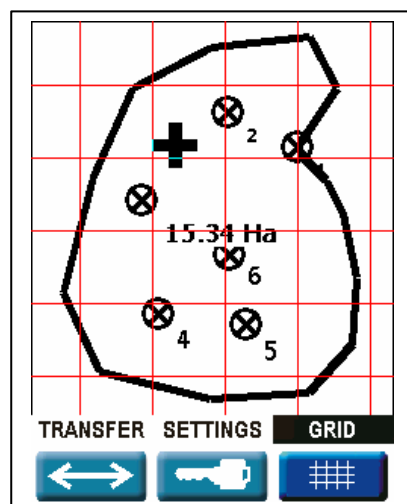
Figure 3.11 – SETUP-GRID menu (in GPS mode)

3.16 Boundaries

Boundaries are used to define the outline of paddocks, and so reference the locations of points within the paddock to an overall paddock image. Boundaries are created by driving the perimeter of the paddock with the boundary-mapping feature activated. The movement of the vehicle leaves behind a "trail" of where it has been.
The Boundary button is located on the MAPPING menu, as shown in Fig 3.12
When the Boundary function is activated, the Boundary icon changes to a STOP symbol. Pressing this button will stop the boundary recording function and enclose the drawn shape. The area enclosed in the boundary and the name given to this area (if any) are displayed on the map screen. Changing the boundary name is done through the LAYER-DETAILS window.
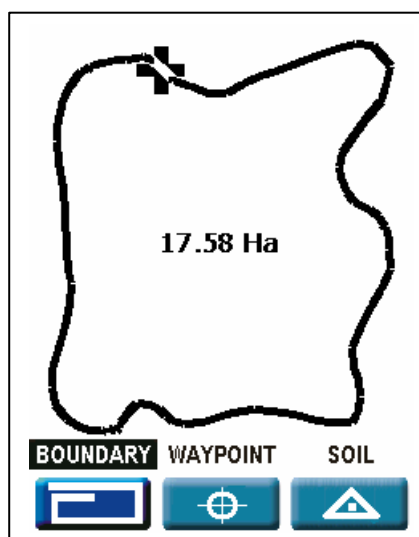
Figure 3.12 - The Mapping menu, with a boundary drawn.

3.17 Waypoints

Waypoints are a flexible tool for pre-determining locations for sampling. Waypoints can be created in either GPS or View mode, and are inserted onto the map screen at the position shown by the position marker. When in GPS mode, this is the current vehicle position in the paddock. When in View mode, the position marker can be manually positioned, thus reducing the time spent in the paddock, and even the need for the farmer to accompany the tester to the location in the paddock.

3.17.1 Creating a Waypoint in the Paddock

Ensure that the system is in GPS mode. Drive the vehicle to the location in the paddock.
Press the *Waypoint* button from the MAPPING menu, as shown in Fig 3.12
A waypoint symbol will be drawn on the map screen at the current location. Each waypoint is
given a unique alphabetic character as an identifier.
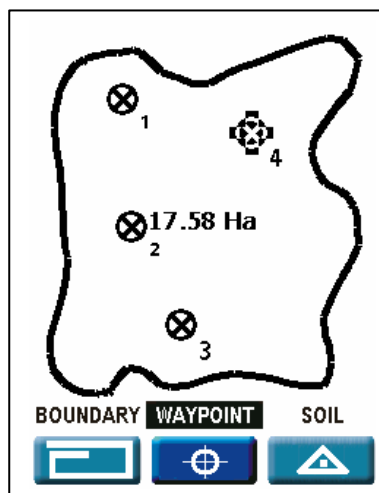
Figure 3.13 Creating waypoints.

3.17.2 Creating a Waypoint Manually

Ensure that the system is in View mode, and that the correct paddock is selected. You will
need to have already created a boundary, in order to be able to geographically reference the
point in the paddock. Touch the map screen at the location at which you wish to insert a
waypoint, then press the WAYPOINT menu button. The waypoint will be drawn, as for Fig
3.13 above.

3.18 Navigating to a Point

Once either sample or waypoints have been entered into the system, these points can be
used to guide the vehicle back to that precise location. Guidance is provided by an on-
screen guide window, which shows both direction and distance to the selected point.
First, a point to which to navigate must be selected. To select a point, simply touch that point
on the map screen. A selected point appears with a dark center.

An unselected soil sample.   A selected soil sample.

Ensure that the system is not in view mode. To activate the on-screen guide, select the
Guide button from the VIEW menu. As you move across the paddock, the guide will indicate
the remaining distance and relative bearing to the selected point. (*Refer to the Glossary in
section 1 for an explanation of relative bearing, if unsure)* **When the arrow in the guide is
pointing straight up, the current vehicle heading is correct.**

Some examples of guidance and their meaning.
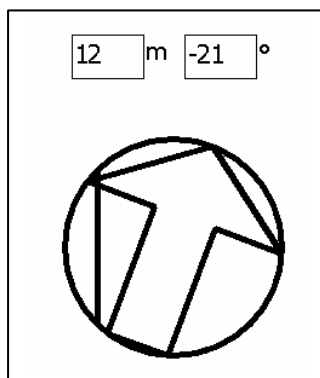
12 m -21 °	176 m 23 °	366 m 157 °
The current vehicle direction is 21 degrees too far to the right. Steer left until arrow centers.	The current vehicle direction is 23 degrees too far to the left. Steer right until arrow centers.	The vehicle is 366m away from the selected point. Line up the arrow and drive for this distance.
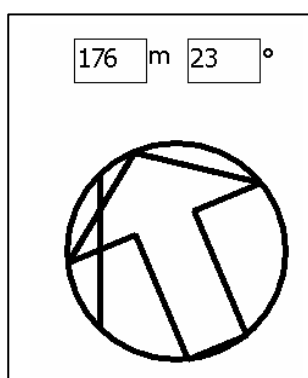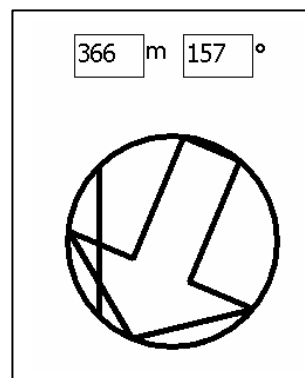
When you have finished with the guidance window, touching it will remove it from the display.

3.19 Laboratories

One of the strengths of the SoilTRAXTITAN software is the ability to be able to present customized data entry forms for the laboratories to which the soil samples will be sent. All the information that the labs need to be able to make their recommendations is included on the form, in the required format.

3.19.1 Changing the Lab

From the SETUP menu, select the SETTINGS button to select your choice of Laboratory.
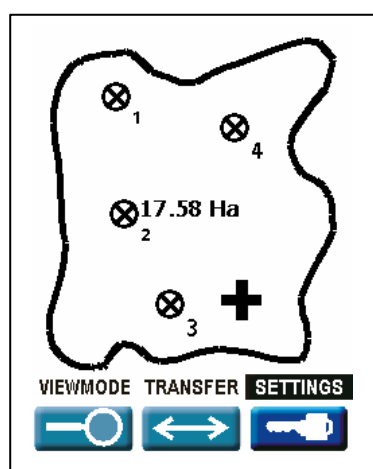
After pressing the LAB button in the *General Setup* window, a *Sample Type* window appears, showing the currently selected LAB. Touch the button to cycle through available choices. If no other choices for LAB are available, touching this button will have no effect.

3.20 Sample Points

Sample points that have been entered into the SoilTRAXTITAN system record the position and all required information of the sample taken at that location. All details of the sample, the location and its history are stored in the system database, and can be recalled at any time.
Sample points are shown on the map screen as a circle, with a unique alpha character identifier.
Sample points can be created in either GPS or View mode. The normal way of creating

sample points is when the vehicle is at the sample point location in the paddock. However, sample points can also be created when the system is in View mode, for those occasions where it is necessary to enter the information after the paddock has been visited.

3.20.1 Creating a Sample Point in GPS Mode.

Ensure that the system is in GPS mode. Ensure that the correct LAB has been selected. Drive to the location in the paddock where the sample is to be taken, then press the *Sample Pt* button from the MAPPING menu (Refer Fig 3.12).
A dialogue window will appear, allowing entry of relevant information about the sample being taken, such as sample depth, soil types and bag numbers.
If the incorrect form appears for the sample you are currently taking, press the Cancel button, and change the Lab selection in the SETUP menu.
After the form information has been entered, a sample point will be drawn on the map screen, at the current location.

3.20.2 Creating a Sample Point in View mode.

Ensure that the correct Lab is selected, and the correct paddock is shown on the map screen. You will need to have already created a boundary, in order to be able to geographically reference the point in the paddock. Touch the map screen at the location at which you wish to insert the Sample Point. After entering relevant information about the sample, a marker indicating the sample location is drawn on the map-screen. This information can be recalled when required.

TECHNOLOGY

4   Transferring SoilTRAX_{TITAN} Information

Paddock information gathered on the Pocket PC can easily be transferred to the desktop computer in the home or office.

Data transfer is accomplished using the supplied compact flash card reader which is connected to the desktop PC via the USB port.

Figure 4.1 – The compact flash card reader

4.1   Installing the Compact Flash Card Reader on the PC

Prior to using the flash card reader on the desktop PC it is necessary to install it's relevant drivers.

To install the necessary drivers for the card reader insert the ZiO installation CD. A window will open offering several options, select 'Install Drivers'.

Another window will then appear, displaying different types of ZiO products. Select 'Compact Flash Reader'.

This will then trigger the InstallShield Wizard similar to the Saturn InstallShield Wizard that will be a guide through the installation process.

After installing the drivers, the flash card reader must now be attached to the office computer. Place the small end of the flash card reader cable into the USB port situated at the rear of the computer. This will be the only possible place in which the cable will fit correctly. The flash card reader is now ready for transferring the data.

If there is no existing USB Port please contact your computer supplier for details of USB installation.

USB Port
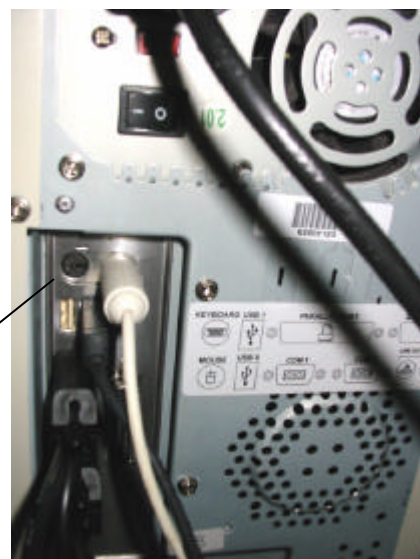
4.2   Exporting Data from the P/PC Device

In order to transfer data on to your desktop PC, the data must first be exported to the compact flash card that is contained within the Pocket PC. Pressing the TRANSFER button from the SETUP menu achieves this.
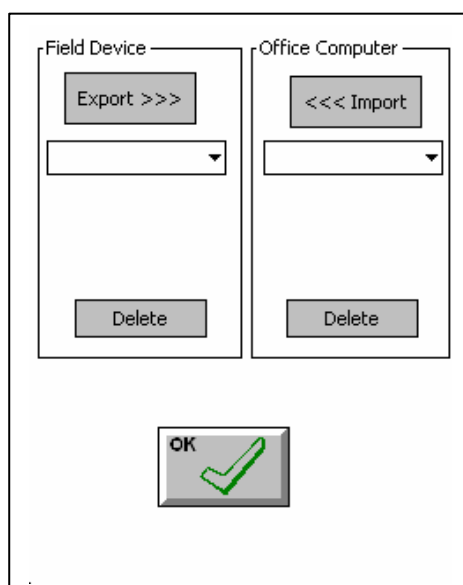
Figure 4.2 - The Transfer window on the P/PC device

The Transfer window is split into two panes. The left pane shows farms/clients currently in your SoilTRAXTITAN system. The right pane shows the farms/clients currently stored on the P/PC device. To create data for exporting from the Pocket PC to the desktop PC, first select the farm/client from the list in the left pane, then press the *Export* >>> button. Check the list of farms/clients in the right pane, to ensure that the copy has been made.
When the compact flash card is next connected to the Office PC via the compact flash card reader, the data can transferred to the desktop PC. Similarly, any new files on the PC can be transferred to the P/PC.

Once the data to be transferred has been specified in the Transfer window, the SoilTRAXTITAN software on the P/PC device must be closed down in order to remove the compact flash card from the Pocket PC.

4.3 Removing the Compact Flash Card and connecting it to the PC

In order to transfer data from the Pocket PC to the office computer the compact flash card must be removed from the Pocket PC. Remove the tip of the Pocket PC. There is a switch located at the back of the Pocket PC, ensure that it is placed in the free position. Located inside is the compact flash card that must be removed. To remove it, press the small square button that is next to the card with the touch pen that is stored on the side of the Pocket PC. This will eject the card, which can now be freely removed.

Compact Flash Card

Flash card reader

Take the card and insert it into the large end of the flash card reader cable following the arrow printed on the card. The office computer can now read the card for any existing data that can now be opened.

4.4 Importing Data into the SoilTRAX Office software.

To import data from the compact flash card click from within the SoilTRAX Office program select Mobile Device - Transfer option on the pull-down menu.

Figure 4.7 - Accessing the Transfer function.

The TRANSFER window shows all farms/clients, which exist in both the SoilTRAX Office and compact flash card connected to the PC.

The left pane shows those, which exist in the SoilTRAX office folder, and those, which are currently in compact flash card, are shown in the right pane.

The window below the Delete button in the right pane allows the selection of data from another P/PC device or set of data. Selecting another entry in the list will show the farms/clients for that entry.
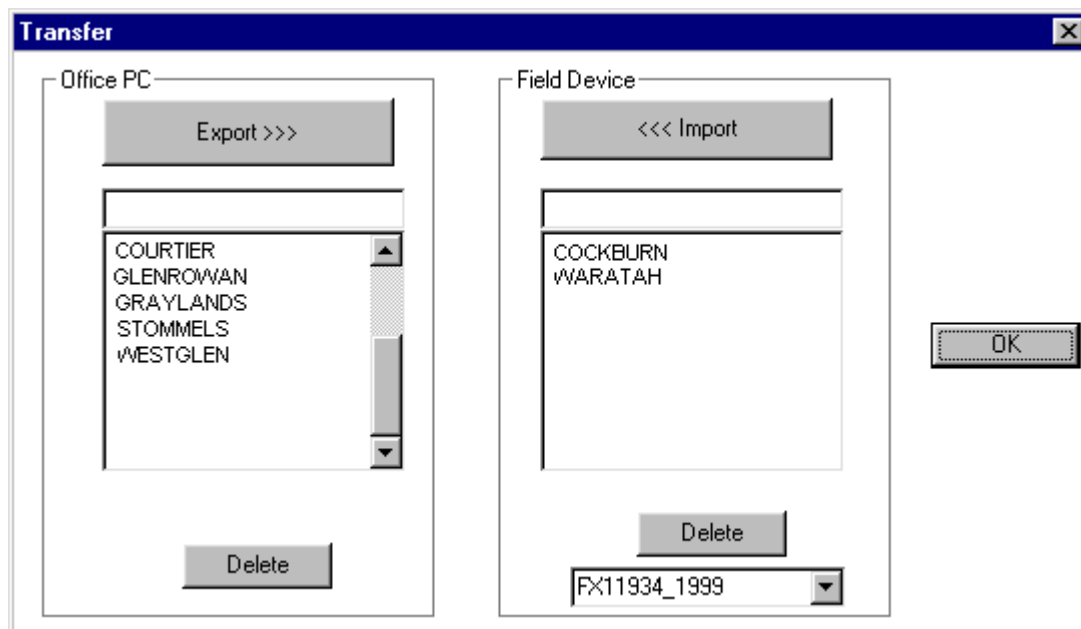
Figure 4.8. - The Transfer window on the Office PC

To import a client into the SoilTRAX Office folder, highlight the client in the right pane and click on the *Import* button. All relevant files will be copied, and the client/farm will appear in the left pane, to indicate that a copy of the information now resides in the SoilTRAX system folder.

In the case that you try to import a client for which there already is data in the SoilTRAX system, a warning message will be raised. It is suggested that you backup any client from the Office system to diskette before using the Delete button.

4.5   Exporting data from the Office PC to the Pocket PC

Sending data to the compact flash card for the Pocket PC is accomplished using the same window as used in the preceding topic.

Select the farm/client in the left pane of the window, check that the correct Field Device is shown under the right pane, and press the *Export* button. The selection will appear in the right pane. When the compact flash card is replaced back in the Pocket PC, the data can be transferred to the device and after importing, will be selectable as a farm.

5   SoilTRAX Office Operations

The SoilTRAX software system, which runs on the desktop PC, allows the data collected on the Pocket PC devices to be collated, completed and printed if required.
Most of the operations carried out on the Pocket PC device are identical on the SoilTRAX system. The menus and screen layout has been kept as similar as possible, for ease of operation. Data is stored as layers in paddocks belonging to farms/clients, in the same way as on the Pocket PC.

5.1   The SoilTRAX Office Screen.
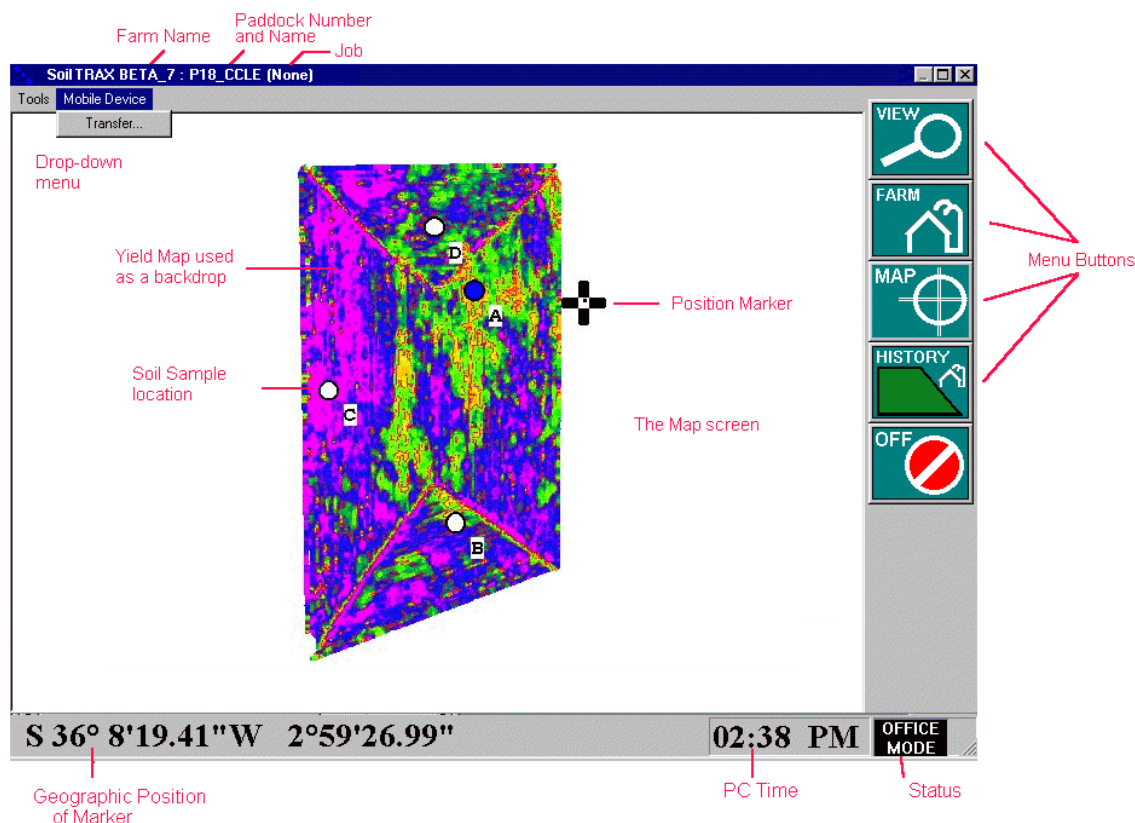
Figure 5.1 - The SoilTRAX Office screen

5.1.1   SoilTRAX Menus

Menu buttons appear down the right side of the map screen, giving access to required functions, in a similar way to the Pocket PC. A list of all menus and their associated buttons appears at Appendix B.
The following paragraphs describe operations that may be carried out on the SoilTRAX system, in addition to those already described in section 3 of this manual.

5.2   Importing and Exporting

The IMPORT and EXPORT options in the *Tools* drop-down menu are provided to allow the sending and receiving of paddock information to/from a data storage device, such as a compact flash card, floppy disk, ZIP or LS120 drive, or any folder on the PC's hard drive(s) for storage, transfer or backup purposes. File formats are converted where required.
*Note: This function is unrelated to that of **transferring** data to or from the Pocket PC, which is described in section 4 of this manual.*

5.2.1 Importing a backdrop map

Geographically referenced bitmap images may be imported, to provide a visual reference for the paddock. Files of Type: *RINEX Photomap files (*.map)* should be selected. Any map files found in the selected location are shown in the select window.
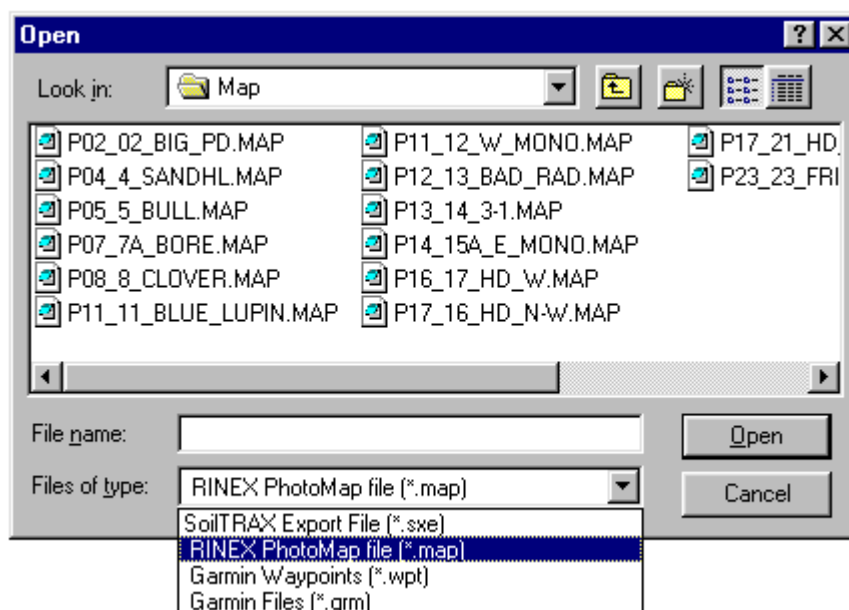
Figure 5.2 -The Import window.

Click on the required map file and press OPEN. The map will be imported into the currently selected Farm. To display the imported map in SoilTRAX, select it from the list of available maps shown using the MAP-BACKDROP menu selection. Only maps, which have been imported into the current selected farm/client, are displayed in the list.

5.2.2 Exporting Paddock Information.

Paddock Information can be exported for backup purposes, or as an export to another software program. The files are saved as a *SoilTRAX Export File (*.sxe)* and contain all paddock information (excluding backdrop maps) for the currently selected client, in a flat-text format. Ensure that the selected export device is ready to receive the data, and press the OPEN button.

5.2.3 Importing Paddock information.

Paddock information, which has previously been exported from SoilTRAX, can be brought back into the system. Files of Type: *SoilTRAX Export File (*.sxe)* should be selected. Ensure that the selected import device contains the information to be imported, then press the OPEN button. All information found on the import device will be brought into the SoilTRAX system. *Note: Importing paddock information should only be done from the RINEX farm/client. This ensures that all files belonging to the imported farm can be updated successfully.*

5.3 Creating Paddock Information.

Waypoints, paddock boundaries and backdrop map layers can be manually created, for transfer to the Pocket PC, if required. Creation of these layers is carried out from the MAP menu.

Farm and Paddock names should always be entered using the on-screen keyboard. This will limit the range of entered characters to those allowed by the system.

5.3.1 Backdrop maps

These can be activated by choosing the map file from the presented list. Only maps available for the current farm are shown in the list. If the map for this paddock does not appear in the list, it must first be imported into the system. Backdrop maps cannot be transferred to the Pocket PC.

5.3.2 Paddock Boundaries

An outline of the paddock can be created manually, by drawing the boundary over an image of the paddock, which has already been geographically referenced. This boundary can then be sent to the Pocket PC.

To create the boundary, first display the bitmap image against which it is to be drawn. Pressing the Boundary button causes the button image to change to a Stop sign. Click and drag the mouse around the paddock boundary on the map screen. A line will be drawn behind the position marker, outlining the boundary. When the boundary is complete, press the "Stop-sign", to stop further drawing of the boundary. A line will be drawn from the last position back to the first, and the enclosed area will be displayed. Further boundaries can then be drawn, if required. A user-defined name can be given to boundaries.

5.3.3 Waypoints

Waypoints can be manually created, by first positioning the marker on the map screen and then pressing the Waypoint button. A waypoint will be inserted at the selected position, and the resulting layer file can then be transferred to the Pocket PC.

5.4 Printing Map data

Paddock map information, including sample and waypoint locations can be sent to a printer from the FARM menu, by selecting the Print button.

A preview of the printed report is shown on-screen.
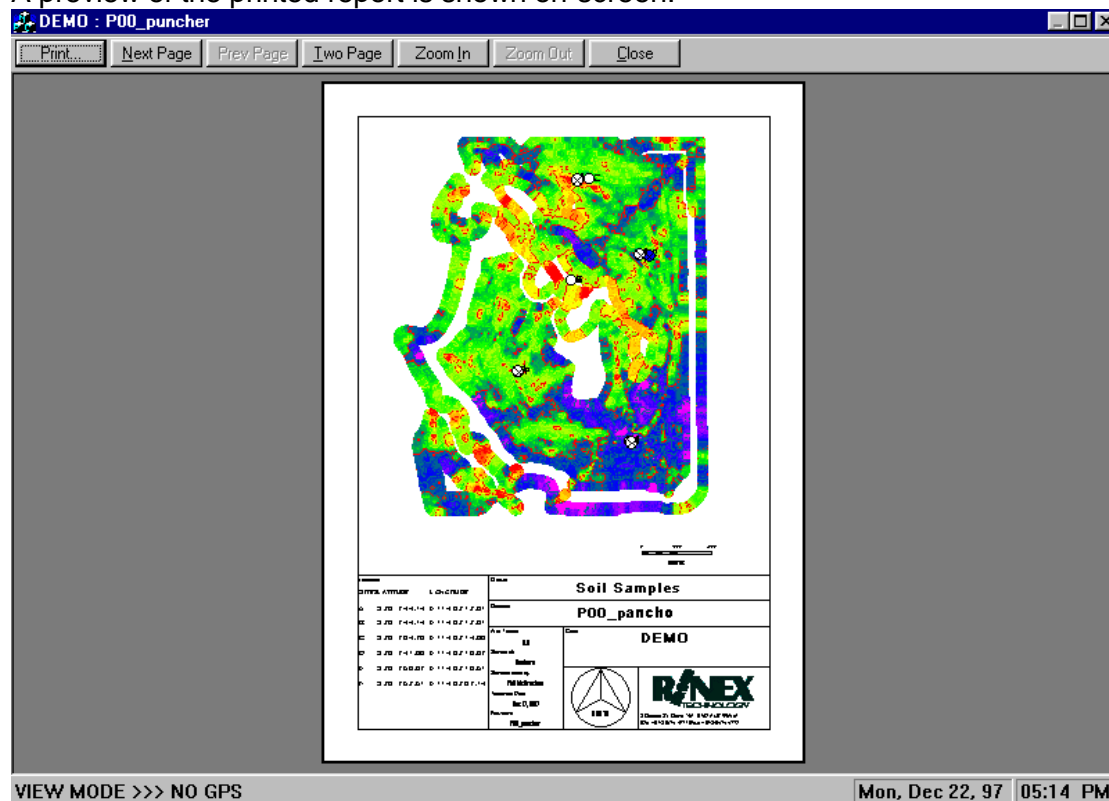
Figures 5.2 - Example of print preview

Pressing the PRINT button at the top of the preview screen raises the standard Windows95 printer dialog window, allowing changes to be made to the printer configuration.

*The RINEX logo appearing at the lower-right corner of printouts can be replaced with one of your choice. To change the logo, replace the file **Logo.bmp** in the **C:\Rinex** directory with one containing the required graphic. The new file must be called **Logo.bmp** and the image must be 8-bit (max 256-colour) .bmp format.*

When you are satisfied with the selected printer and configuration, press the OK button to send the map to the printer.

5.5   Changing the LAB

Changing the currently selected Laboratory is done by pressing the *Setup* button from the MAIN - MORE menu. The LAB option is on the second page of general options.
This setting customizes the information requested and the layout of Area Information Forms to that requested by the laboratory analyzing your soil samples. Available choices for Lab depend on modules that have been installed onto your PC. If your choice of Lab does not appear in the list, please contact RINEX Technology for information on additional Lab modules.

5.6   The Drop-down Menu

Options related to the transferring of information to the field device, and importing or exporting information for access by software applications such as PAM or Pin-point are contained in this menu.

5.6.1   Transferring data to/from the Pocket PC Synchronization Folder.

Using this option either moves data to, or receives data from the compact flash card for the Pocket PC. When a compact flash card is next connected, all data in the compact flash card can be transferred onto the office PC. *(Refer to Section 4 of this manual for further details on synchronization.)*

5.6.2   Third-Party software formats.

Data that has been created using third-party software may be converted and imported into the SoilTRAX office system. Similarly, SoilTRAX office data may be able to be converted to the format of other software programs, to enable the information to be exported to those programs.
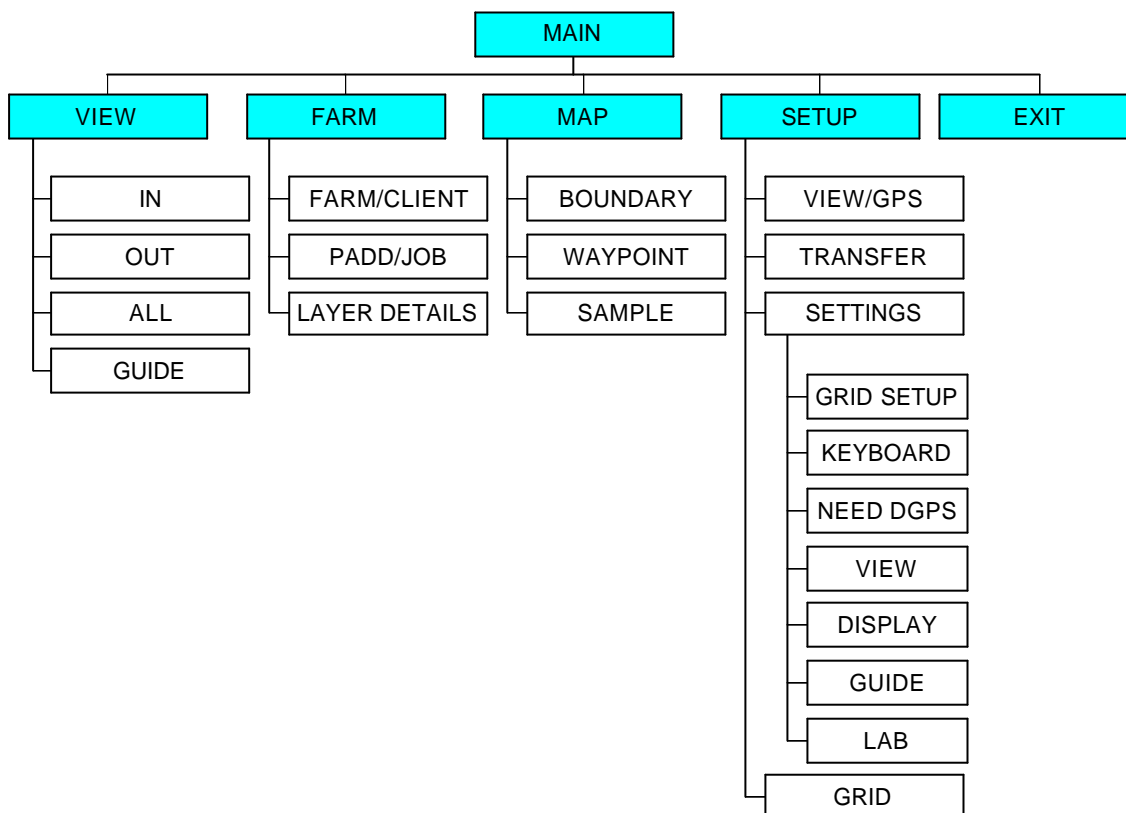
APPENDIX A – The SoilTRAX_TITAN Menu

The following diagram shows the menus and their associated buttons that are available in the SoilTRAX_TITAN system, which runs on the Pocket PC. Menu headings and sub-menus are shown with a shaded background, while buttons in that menu are not shaded.

SOILTRAX_LITE 1.0

```
                              ┌──────────────┐
                              │     MAIN     │
                              └──────┬───────┘
        ┌───────────┬───────────────┼───────────────┬───────────┐
  ┌──────────┐ ┌──────────┐   ┌──────────┐    ┌──────────┐ ┌──────────┐
  │   VIEW   │ │   FARM   │   │   MAP    │    │  SETUP   │ │   EXIT   │
  └────┬─────┘ └────┬─────┘   └────┬─────┘    └────┬─────┘ └──────────┘
       │            │              │               │
  ┌─────────┐ ┌─────────────┐ ┌───────────┐  ┌───────────┐
  │   IN    │ │ FARM/CLIENT │ │ BOUNDARY  │  │ VIEW/GPS  │
  └─────────┘ └─────────────┘ └───────────┘  └───────────┘
  ┌─────────┐ ┌─────────────┐ ┌───────────┐  ┌───────────┐
  │   OUT   │ │  PADD/JOB   │ │ WAYPOINT  │  │ TRANSFER  │
  └─────────┘ └─────────────┘ └───────────┘  └───────────┘
  ┌─────────┐ ┌─────────────┐ ┌───────────┐  ┌───────────┐
  │   ALL   │ │LAYER DETAILS│ │  SAMPLE   │  │ SETTINGS  │
  └─────────┘ └─────────────┘ └───────────┘  └───────────┘
  ┌─────────┐                                      │
  │  GUIDE  │                               ┌────────────┐
  └─────────┘                               │ GRID SETUP │
                                            └────────────┘
                                            ┌────────────┐
                                            │  KEYBOARD  │
                                            └────────────┘
                                            ┌────────────┐
                                            │  NEED DGPS │
                                            └────────────┘
                                            ┌────────────┐
                                            │    VIEW    │
                                            └────────────┘
                                            ┌────────────┐
                                            │  DISPLAY   │
                                            └────────────┘
                                            ┌────────────┐
                                            │   GUIDE    │
                                            └────────────┘
                                            ┌────────────┐
                                            │    LAB     │
                                            └────────────┘
                                      ┌──────────────┐
                                      │     GRID     │
                                      └──────────────┘
```

APPENDIX B – The SoilTRAX Office menu

The following diagram shows the menus and their associated buttons that are available in the SoilTRAX Office system, which runs on the office desktop PC. Menu headings and sub-menus are shown with a shaded background, while buttons in that menu are not shaded.

SoilTRAX OFFICE